

REMARKS

As a result of the foregoing amendment, claims 9-14 have been cancelled thereby obviating the art rejection thereof.

Submitted herewith is a corrected drawing of Fig.2 in which the number "27" has been deleted.

Also submitted herewith is a certified copy of the priority document.

The remaining claims have been amended in a manner which overcomes each of the various objections and formal rejections thereof. The examiner's assistance in suggesting language with respect to these amendments is appreciated.

We believe the amendments to the claims clearly respond to each of the objections and/or rejections raised by the examiner and overcome each of the said objections and rejections.

With respect to the examiner's objection in paragraph 10 of the office action, a modification has been made in the claim however, it is noted that the "electrode unit" comprises a silver layer and a silver halide layer as recited in the claims.

Accordingly, all of the various objections and rejections on formal grounds have been obviated and should be withdrawn. If the examiner has any further objections of this nature, the examiner is requested to telephone the undersigned attorney to discuss these and take care of them.

The examiner's indication of allowable subject matter is appreciatively acknowledged. It is believed that as a result of the foregoing amendment, this application is now in condition for allowance and favorable reconsideration and prompt notice of allowance are earnestly solicited.

Respectfully submitted,

Jules E. Goldberg - Reg. No. 24,408
Reed Smith LLP
599 Lexington Avenue
New York, NY 10022
Tel. No. (212) 521-5403

December 17, 2002

MARKED-UP COPY

IN THE SPECIFICATION

At page 2, line 12

Among the determination of concentration of various ions in a body fluid such as blood or serum, the determination of an ionic calcium is very important in the clinical test. The determination of an ionic calcium (i.e., calcium ion) in blood is necessary, for instance, when a patient is tested with respect to abnormal metabolism (for example, functional disorder of accessory thyroid or transfer of cancer to bone). Also important is the determination of concentration of hydrogen ion (in term of pH) in blood, because the pH value of the blood indicates [teaches] an acid-base balance in the blood. Moreover, in most of the clinical tests, the ionic calcium concentration in blood is generally utilized after it is standardized in terms of a concentration value at pH 7.4. Therefore, it is of value that both of the calcium ion concentration and the hydrogen ion concentration are simultaneously determined in a simple procedure.

At page 3, line 27

As a result of study of the present inventors, it has been discovered that the calcium ion selective electrode having a calcium ion selective membrane of a very small thickness gives good analytical results in the reproducibility of the analytical data and the response time. Further, it has been discovered the calcium ion selective membrane having a small thickness preferably contains calcium di[4- (1,1,3,3-tetramethylbutyl)phenyl] [[4- (1,1,1,3-tetramethylbutyl)phenyl]] phosphate (t-HDOPP), particularly in combination with a vinyl acetate copolymer and dioctylphenyl phosphonate so as to obtain the analytical data of increased accuracy.

At page 9, lines 9 and 12

The calcium ion selective membrane of the calcium ion selective electrode of the invention preferably contains calcium di[4-(1,1,3,3-tetramethylbutyl)phenyl] [[4-(1,1,1,3-tetramethylbutyl)phenyl]] phosphate, and preferably comprises a vinyl chloride-vinyl acetate copolymer, dioctylphenyl phosphonate and calcium di[4-(1,1,3,3-tetramethylbutyl)phenyl] [[4-(1,1,1,3-tetramethylbutyl)phenyl]] phosphate. However other known components for the preparation of a calcium ion selective membrane can be employed.

At page 11, line 31

Composition of calcium ion selective layer

Calcium di[4-(1,1,3,3-tetramethylbutyl)phenyl] [[4-(1,1,3,3-tetramethylbutyl)phenyl]]

IN THE CLAIMS

Please cancel claims 9-14.

1. (amended) A composite ion selective electrode comprising a calcium ion selective electrode member and a hydrogen ion selective electrode member,

in which the calcium ion selective electrode member comprises an electro-insulating support, a first pair of electrode units each which comprises a silver layer and a silver halide layer, [and which are] the pair of electrodes being electrically separated from each other, an electrolyte layer, and a calcium ion selective membrane, and

in which the hydrogen ion selective electrode member comprises an electro-insulating support, a second pair of electrode units each of which comprises a silver layer and a silver halide layer, and which are electrically separated from each other, an electrolyte layer, and a hydrogen ion selective membrane;

(2) an electro-insulating member having two openings in which one opening is provided for introducing a sample liquid into [the composite electrode] one electrode of the calcium ion selective electrode of the calcium ion selective electrode member and one electrode of the hydrogen ion selective electrode member and another opening is provided for introducing a reference liquid into the composite electrode;

(3) a pair of distributing members in which one distributing member distributes the introduced sample liquid to the ion selective membrane of each ion selective electrode member at a site corresponding to one electrode unit and in which another distributing

member distributes the introduced reference liquid to the ion selective membrane of each ion selective electrode member at a site corresponding to another electrode unit; and

(4) a bridge member which is provided on the electro-insulating member to bridge the two openings of the electro-insulating member so as to electrically connect the introduced sample liquid and the introduced reference liquid; which is characterized in that the calcium ion selective membrane has a thickness of 5 to 30 μ m, and the hydrogen ion selective membrane contains tri-n-dodecylamine and trisethylhexyl trimellitate.

2. (amended) The composite ion selective electrode of claim 1, wherein the calcium ion selective membrane contains calcium [di[4-(1,1,1,3-tetramethylbutyl)phenyl]] di[4-(1,1,3,3-tetramethylbutyl)phenyl] phosphate.

3. (amended) The composite ion selective electrode of claim 1 [2], wherein the calcium ion selective membrane comprises a vinyl chloride-vinyl acetate copolymer, dioctylphenyl phosphonate, and calcium [di[4-(1,1,1,3-tetramethylbutyl)phenyl]] di[4-(1,1,3,3-tetramethylbutyl)phenyl] phosphate.

8. (amended) A method for determining a standardized calcium ion concentration in a sample blood, which comprises the steps of:
spotting a sample blood and a reference liquid onto openings of the electro-insulating member of the composite ion selective electrode of claim 1, [respectively,]

measuring potentiometrically a calcium ion concentration and a hydrogen ion concentration in the sample blood; and incorporating the measured calcium ion concentration and the measured hydrogen ion concentration into the following equation to obtain a value of Log (standardized iCa):

$$\text{Log (standardized iCa)} =$$

$$\text{Log (iCa at pH)} - 0.22 \times (7.4 - \text{pH})$$

in which iCa is [means] a calcium ion concentration and pH is [means] a hydrogen ion concentration.

10. (amended) The calcium ion selective electrode of claim 9, wherein the calcium ion selective membrane contains calcium di[4-(1,1,3,3-tetramethylbutyl)phenyl] [[4-(1,1,1,3-tetramethylbutyl)phenyl]] phosphate.

11. (amended) The calcium ion selective electrode of claim 10, wherein the calcium ion selective membrane comprises a vinyl chloride-vinyl acetate copolymer, dioctylphenyl

phosphonate, and calcium di[4-(1,1,3,3-tetramethylbutyl)10 phenyl] phosphate [[4-(1,1,3,3-tetramethylbutyl)10 phenyl]].

16. (amended) A hydrogen ion selective electrode comprising

(1) a hydrogen ion selective electrode member which comprises an electro-insulating support, a pair of electrode units each of which comprises a silver layer and a silver halide layer, [and which are] the pair of electrodes being electrically separated from each other, an electrolyte layer, and a hydrogen ion selective membrane;

(2) an electro-insulating member having two openings which is provided on the hydrogen ion selective electrode member and in which one opening is provided for introducing a sample liquid into the [composite electrode] another electrode of the calcium ion selective electrode member and another electrode of the hydrogen ion selective electrode member and another opening is provided for introducing a reference liquid into the [composite electrode] another electrode of the calcium ion selective electrode member and another electrode of the hydrogen ion selective electrode member; and

(3) a bridge member which is provided on the electro-insulating member to bridge the two openings of the electro-insulating member so as to electrically connect the introduced sample liquid and the introduced reference liquid;

which is characterized in that the hydrogen ion selective membrane contains tri-n-dodecylamine and triethylhexyl trimellitate.

16. (amended) The hydrogen ion selective electrode of claim 15, wherein the hydrogen ion selective membrane [comprises tri-n-dodecylamine, trimethylhexyl trimellitate,] further contains potassium tetrakis (p-chlorophenylborate) and a vinyl chloride-vinyl acetate copolymer.

18. (amended) The [composite] hydrogen ion selective electrode of claim 15, wherein the electrolyte layer comprises sodium chloride.